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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

FORESTER (profess. and kin.) 0-35.07

B-520 S-243

U. S. Employment Service
in Cooperation with
Colorado and Wyoming State Employment Service

April 1963

GATB #2411

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

FORESTER (profess. and kin.) 0-35.07

B-520

Summary

The General Aptitude Test Battery, B-1002A, was administered to a final sample of 80 male subjects employed as Forester 0-35.07 by the U. S. Forest Service in Colorado and Wyoming. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data and their combined selective efficiency, Aptitudes V-Verbal, S-Spatial and K-Motor Coordination were selected for inclusion in the final test norms.

GATB Norms for Forester 0-35.07 B-520.

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
V	CB-1- J	110	V	Part 4	110
S	CB-1- F CB-1- H	110	S	Part 3	105
T	CB-1- G CB-1- K	85	K	Part 8	90

Effectiveness of Norms

The data in Table IV indicate that 14 of the 25 poor workers, or 56 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 56 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 39 of the 50 workers who made qualifying test scores, or 78 percent, were good workers.

TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Forester 0-35.07.

II. Sample

The GATB, B-1002A was administered to an employed sample of 98 Forester Rangers presently employed by the U.S. Forest Service in Colorado and Wyoming. The following is a listing of the forest, location of testing, number initially tested, number retained in the study, and date of testing of the 98 Foresters tested.

Forest	Where Tested	No. Tested	In Study	Date
Arapaho	Golden, Colo.	5	5	3-15-61
Grand Mesa - Uncompahgre	Delta, Colo.	5	5	2-16-61
San Juan	Delta, Colo.	6	6	2-16-61
Gunnison	Delta, Colo.	6	6	2-16-61
Pike	Colo. Springs, Colo.	12	7	1-26-61
Rio Grande	Monte Vista, Colo.	6	6	4-14-61
Roosevelt	Fort Collins, Colo.	6	6	4-27-61
Routt	Steamboat Spgs., Colo.	13	6	1-23-61
San Isabel	Pueblo, Colo.	11	6	1-25-61
White River	Glenwood Spgs., Colo.	8	8	3-8-61
Big Horn	Sheridan, Wyoming	6	5	4-27-61
Medicine Bow	Laramie, Wyoming	9	9	2-24-61
Shoshone	Cody, Wyoming	5	5	3-13-61

Of the 18 not included in the final sample, 17 were Junior Forest Rangers and one was not rated because he had not been under supervision of the Forest Supervisor long enough for his work to be rated. The Foresters were tested on time set aside during their respective spring meetings and participation was requested by the Forest Supervisor.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 80	M	σ	Range	r
Age (years)	40.6	9.4	26-59	-.021
Education (years)	15.9	1.2	10-18	-.115
Experience (months)	128.0	105.7	9-420	-.012

III. Job Description

Job Title: Forester (profess. & kin.) 0-37.07.

Job Summary: Under the general direction of the Forest Supervisor, manages and develops the timber, recreational, and grazing resources of a designated forest district.

Work Performed: Inspects district to determine whether or not it possesses lumber suitable for harvest. Computes, using slide rule, mathematics and knowledge of timber and lumber-cutting procedures, the board feet contained in a stand of timber suitable for harvest, determining the amounts of the various grades of lumber such a harvest would yield. Makes recommendations relative to timber cutting based on the cost of the operation, including accessibility, patch or strip cutting, cost of bringing in equipment, the terrain, cost of reforestation, and many other related factors. Directs noncommercial cutting of timber in lumber-yielding areas to promote maximum growth of the best stock. Directs reforestation of areas devastated by fire, disease, or avalanche, as well as those where cutting has occurred, determining the species of trees best suitable to the terrain and possible multi-purpose use. Makes evaluation of grazing potential of district, using knowledge of grasses, their growth, their stand to grazing, as well as knowledge of the grazing habits of such animals as sheep and cattle. Submits recommendations based on finding as to whether or not grazing permits should be granted.

Analyzes reports on public use of existing recreational facilities in own district, and surveys conducted for the purpose of ascertaining the type of recreational facilities the public is seeking, in order to determine if there is a need for change and/or expansion of present facilities or possible new recreational areas and/or facilities in his district. Makes surveys of district, using aerial maps and making personal inspection to determine the availability of recreational sites and possible cost of preparation of the area.

Maintains fire lookout stations consistent with season, weather, moisture content, and other aspects for the earliest and most accurate detection of forest fires. Instructs subordinates in methods and importance of manning fire lookout stations. Trains personnel in most up-to-date methods of fire suppression, taking into account variation in terrain, wind conditions, accessibility, and other factors. Appears before civic, scout, school, and other groups, lecturing on forest fire prevention and camping safety. Informs listeners on responsibility of forest officials in administering a forest district, responsibility of the public in using extreme care while camping, boating, hunting, or hiking, and otherwise keeps the public informed. Conducts a training program for temporary summer employees in safety, fire detection and suppression, road building, telephone line and fence maintenance, and recreation facility supervision. Submits work orders and reports pertinent to his district.

IV. Experimental Battery

All the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion for the sample was based on the job performance in all areas of work. The Forest Supervisor of each forest involved made two independent ratings for each Forester under his supervision. The second rating was made at least two weeks after the first rating. Criterion data for the sample were collected during May and June, 1961. A supervisor's descriptive rating scale was used for the collection of this data. The correlation of the first rating with the second rating was .939. This is significant at the .01 level of confidence. The first and second ratings were then averaged and this average was used as the final criterion. The distribution of scores had a range of 18-44 with a mean of 33.044 and a standard deviation of 5.385.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation;

Intelligence (G) - required to learn the many aspects of lumber cutting, grazing, and recreation management and development. Necessary in order to learn material presented in course work on a university level.

Verbal Aptitude (V) - required to comprehend instructions, both verbal and written, received from supervisor, and to direct, instruct, and inform others. Necessary in order to comprehend technical and scientific matter presented in text books and to write reports, examinations and papers.

Numerical Aptitude (N) - required to compute lumber harvest yield, grazing potential, and make and interpret surveys and reports. Necessary in order to complete courses in mathematics, physics, and chemistry on a university level.

Spatial Aptitude (S) - required to read blueprints for construction and maintenance and to make maaningful interpretations of topographical maps and aerial photographs. Necessary in order to complete courses in map drafting and reading, surveying, and botany on a university level.

B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 80

Aptitudes	M	σ	r
G-Intelligence	124.5	11.7	.061
V-Verbal Aptitude	121.4	12.3	.124
N-Numerical Aptitude	117.4	11.8	.203
S-Spatial Aptitude	116.7	18.1	-.079
P-Form Perception	107.7	14.1	.162
Q-Clerical Perception	112.0	14.4	.131
K-Motor Coordination	109.9	17.6	.257*
F-Finger Dexterity	98.8	20.6	.148
M-Manual Dexterity	102.2	20.4	.167

*Significant at the .05 level.

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X	X	X					
Irrelevant									
Relatively High Mean	X	X	X	X					
Relatively Low Sigma	X	X	X		X				
Significant Correlation with Criterion							X		
Aptitudes to be Considered for Trial Norms	G	V	N	S			K		

Trial norms consisting of various combinations of Aptitudes G,V,N,S and K with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of V-110, S-105 and K-90 had the best selective efficiency.

VII. Validity of Norms (Concurrent)

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 31 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes V, S and K with critical scores of 110, 105 and 90, respectively, and the dichotomized criterion for Forester 0-37.07.
Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Forester 0-37.07
(V-110, S-105, K-90)

N = 80	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	16	39	55
Poor Workers	14	11	25
Total	30	50	80

Phi Coefficient = .26
χ^2 = 5.328
P/2 < .025

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes V, S, and K with minimum scores of 110, 105 and 90, respectively, have been established as B-1002 norms for Forester 0-37.07.
The equivalent B-1001 norms consist of V-110, S-110 and T-85.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for incorporation into any of the existing 35 OAP's (revised 10/61). The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.